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In the claims:

Please amend the claims as follows.

1. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group;

the electrophilic or nucleophilic functional group selected from the group consisting of hydrogen-termination, alkyl groups, quaternary ammonium groups, carbon, silicon, halogens, oxygen, hydrogen, nitrogen, sulfur and phosphorus;

wherein at least one biomolecule is adsorbed to the electrophilic functional group.

2. (Original) The substrate according to Claim 1, wherein M is silicon.

3. (Previously Presented) The substrate according to Claim 2, wherein the chemically crosslinked material comprises from about 30 to about 60 percent carbon and from about 10 to about 40 percent silicon.

4. (Canceled).

5. (Original) The substrate according to Claim 1[[4]], wherein the at least one electrophilic functional group comprises one or more elements selected from the group consisting of carbon, hydrogen, nitrogen and silicon.

6. (Canceled).

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7. (Currently Amended) The substrate according to Claim 16, wherein the at least one biomolecule is selected from the group consisting of DNA, nucleic acids, proteins, enzymes, cells, viruses, and combinations thereof.

8-10. (Canceled).

11. (Original) A substrate according to Claim 1, wherein at least one portion of the surface of the coating is terminated with at least one electrophilic functional group and at least one other portion of the surface of the coating is terminated with at least one nucleophilic functional group.

12. (Original) The substrate according to Claim 11, wherein the at least one portion of the surface of the coating terminated with at least one electrophilic functional group and at least one other portion of the surface of the coating terminated with at least one nucleophilic functional group are adjacent to one another.

13. (Original) The substrate according to Claim 11, wherein the at least one nucleophilic functional group comprises one or more elements selected from the group consisting of carbon, silicon, halogens, oxygen, hydrogen, nitrogen, sulfur, and phosphorus.

14. (Original) The substrate according to Claim 11, wherein the at least one electrophilic functional group comprises one or more elements selected from the group consisting of carbon, nitrogen, hydrogen, and silicon.

15. (Original) The substrate according to Claim 11, wherein at least one biomolecule is adsorbed to the at least one electrophilic functional group.

16. (Original) The substrate according to Claim 15, wherein the at least one biomolecule is selected from the group consisting of nucleic acids, proteins, enzymes, cells, viruses, and combinations thereof.

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17. (Previously Presented) The substrate according to Claim 1, wherein the coating has a thickness between about 200 nanometers to about 400 nanometers.

18. (Original) The substrate according to Claim 1, wherein the base layer comprises a material selected from the group consisting of glass, plastics, elastomers, metals, and ceramics.

19. (Original) The substrate according to Claim 1, further comprising an intermediate layer positioned between said base layer and said coating.

20. (Original) The substrate according to Claim 19, wherein the intermediate layer comprises at least one material selected from the group consisting of indium tin oxide (ITO), tin oxide, titanium oxide, manganese oxide, lead oxide, gold, platinum, palladium, carbon, , silicon, germanium, zinc oxide, cadmium sulfide, titanium dioxide, gallium arsenide, combinations thereof, and alloys thereof.

21-43. (Canceled).

44. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium, and yttrium; (2) M, O, H, and N wherein M is defined above; and (3) O, C, H, a and N and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group, wherein at least one biomolecule is adsorbed to the electrophilic functional group.

45. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon,

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titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium, and yttrium; (2) M, O, H, and N wherein M is defined above; (3) O, C, H, a and N; and (4) M or C, and one of O, H, or N; and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group, wherein at least one biomolecule is adsorbed to the electrophilic functional group.

46. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising Si, C, and H deposited in a PECVD process with a tetra methyl silane ($\text{Si}(\text{CH}_3)_4$) precursor and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group, wherein at least one biomolecule is adsorbed to the electrophilic functional group.

47. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group and wherein the at least one electrophilic or nucleophilic functional group is deposited by a plasma treatment, wherein at least one biomolecule is adsorbed to the electrophilic functional group.

48. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon,

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titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium;
(2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic functional group for electrostatically attracting positively charged molecules for adsorption and electrostatically repelling negatively charged molecules for non-adsorption, wherein at least one biomolecule is adsorbed to the electrophilic functional group.

49. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one nucleophilic functional group for electrostatically attracting negatively charged molecules for adsorption and electrostatically repelling positively charged molecules for nonadsorption, wherein the surface of the coating is non-adsorbing with respect to biomolecules.

50. (Currently Amended) A substrate comprising a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one nucleophilic functional group, wherein the surface of the coating is non-adsorbing with respect to biomolecules.

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51. (Previously Presented) A substrate according to Claim 1, further comprising a nucleic acid nonspecifically adsorbed to said at least one electrophilic or nucleophilic functional group.

52. (Previously Presented) A substrate according to Claim 1, further comprising a protein nonspecifically adsorbed to said at least one electrophilic or nucleophilic functional group.

53. (Previously Presented) A substrate according to Claim 1, wherein the coating is deposited using a precursor selected from the group consisting of silanes, siloxanes, silazanes, hydrocarbons, metal organics, titanates, metal alkoxides, and combinations of the above.

54. (Previously Presented) A substrate according to Claim 1, wherein the coating is deposited using a precursor selected from the group consisting of tetrametylsilane, trimetylsilane, tetramethoxysilane, heamethyl disilane, hexamethyl disiloxane, hexamethyl disilazane, methane, ethane, ethylene, tetraalkoxy titanates, and combinations of the above.